

COMPLETE D-BLOCK

- The atomic radius of Ag is closest to :
(1) Cu (2) Hg (3) Au (4) Ni
- Consider the following reactions :
 $\text{NaCl} + \text{K}_2\text{Cr}_2\text{O}_7 + \text{H}_2\text{SO}_4(\text{Conc.}) \rightarrow (\text{A}) + \text{Side products}$
 $(\text{A}) + \text{NaOH} \rightarrow (\text{B}) + \text{Side product}$
 $(\text{B}) + \text{H}_2\text{SO}_4(\text{dilute}) + \text{H}_2\text{O}_2 \rightarrow (\text{C}) + \text{Side product}$
The sum of the total number of atoms in one molecule each of (A), (B) and (C) is
- The third ionization enthalpy is minimum for :
(1) Fe (2) Ni
(3) Co (4) Mn
- The sum of the total number of bonds between chromium and oxygen atoms in chromate and dichromate ions is _____.
- The set that contains atomic number of only transition element is -
(1) 21, 32, 53, 64
(2) 21, 25, 42, 72
(3) 9, 17, 34, 38
(4) 37, 42, 50, 64

- The incorrect statement(s) among (a) - (c) is (are) :-
(a) W(VI) is more stable than Cr(VI).
(b) in the presence of HCl, permanganate titrations provide satisfactory results.
(c) some lanthanoid oxides can be used as phosphors.
(1) (a) and (b) only (2) (a) only
(3) (b) and (c) only (4) (b) only
- The INCORRECT statement is :
(1) bronze is an alloy of copper and tin.
(2) brass is an alloy of copper and nickel
(3) cast iron is used to manufacture wrought iron
(4) german silver is an alloy of zinc, copper and nickel
- The incorrect statement is :
(1) In manganate and permanganate ions, the π -bonding takes place by overlap of p-orbitals of oxygen and d-orbitals of manganese
(2) Manganate ion is green in colour and permanganate ion is purple in colour
(3) Manganate and permanganate ions are paramagnetic
(4) Manganate and permanganate ions are tetrahedral

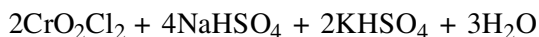
SOLUTION

1. NTA Ans. (3)

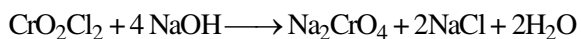
Sol. Atomic radius of Ag and Au is nearly same due to lanthanide contraction.

2. NTA Ans. (18.00)

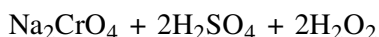
Sol. $4\text{NaCl} + \text{K}_2\text{Cr}_2\text{O}_7 + 6\text{H}_2\text{SO}_4$



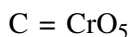
(A)



(B)



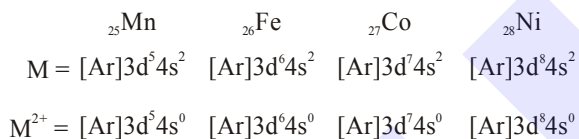
(C)



Total number of atom in A + B + C = 18

3. NTA Ans. (1)

Sol. Electronic configuration of

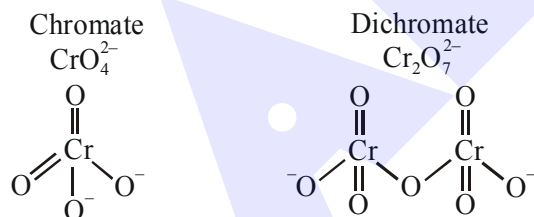


So third ionisation energy is minimum for Fe.

4. NTA Ans. (12.00)

ALLEN Ans. (18.00)

Sol.



Total Cr-O bonds = 6 (4 σ + 2 π) Total Cr-O bonds = 12 (8 σ + 4 π)

Total number of bonds between chromium and oxygen in both structures are 18.

Note :- But answer of NTA is 12. They consider only linkages between Chromium and Oxygen but in question total no. of bonds are asked so σ and π bonds must be considered separately.

5. Official Ans. by NTA (2)

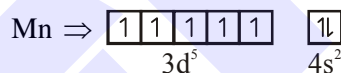
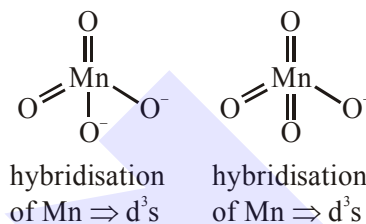
6. Official Ans. by NTA (4)

Sol. KMnO_4 will not give satisfactory result when it is titrated by HCl.

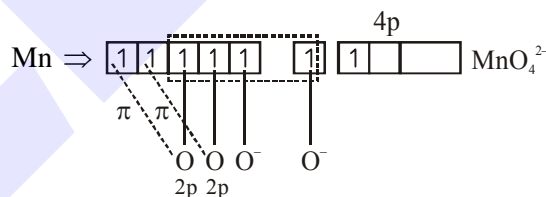
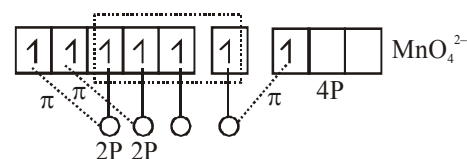
7. Official Ans. by NTA (2)

8. Official Ans. by NTA (3)

Sol. Option 1) Manganate $\Rightarrow \text{MnO}_4^{2-}$,

Permanganate $\Rightarrow \text{MnO}_4^-$ 

After excitation

 $2 \times 2p_\pi - 3d_{\pi\sigma}$  $2 \times 2p_\pi - 3d_\pi$ $1 \times 2p_\pi - 4p_\pi$ (2) $\text{MnO}_4^{2-} \Rightarrow$ green $\text{MnO}_4^- \Rightarrow$ purple/violet

(3) Manganate contains 1 unpaired electron hence it is paramagnetic

where as permanganate contains no unpaired electrons hence it is diamagnetic.

(4) Both have d^3s hybridisation hence both have tetrahedral geometry.